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It is a little singular that certain species do not vary, species which are not only found from ocean to ocean in North America, but which are nearly or quite cosmopolitan. Why this should be true of some species and not of others is still an open question. If the scorching sun of the desert regions will bleach out one species why will it not do the same for another? The plea of adaptation of coloration for protection cannot be urged here.

Not only are colors affected, but size as well, by geographical position. This is probably more marked north and south than east and west. And yet the variation in size alone is not sufficient for a subspecific division. It is not at all strange that those individuals of a migratory species which push farthest north should possess stronger bones and muscles, and so be larger than those which were not able to fly so far. It would seem natural that the constant recurrence of such a difference would tend, in time, to form a race peculiar enough to be recognized as a sub species. But it has not proven true thus far in the history of the world, and why should there be any change under the same conditions?

LYNDS JONES.

Oberlin, Ohio, Dec. 26.

On the Use of the Compound Eyes of Insects.

IN an interesting note on the above subject by Mr. E. T. Lewis in *Science* of Dec. 2, there is a reference to my note on Professor Exner's beautiful researches on the question of how the compound eyes of insects see, in my recent edition of "The Microscope and Its Revelations." Mr. Lewis says (p. 315), "but it may be as well to note that the figure on page 908 of 'The Microscope and Its Revelations' appears to have been laterally inverted by the engraver," his observations enabling him to say "that in the original photograph the letter R was not reversed as shown in the wood-cut, and the church faced the other way."

This is entirely fallacious; the wood-cut in the current edition of the "Revelations of the Microscope" is in every sense correct. It has been seen by Exner, and was copied from the original photograph, which now lies before me as sent me by Professor Exner himself; and a study of "Die Physiologie der Facettirten Augen von Krebsen und Insecten" will make this clear.

W. H. DOLLINGER.

Lee, London, S.E., England.

Discovery of Mexican Feather-Work in Madrid.

THERE are not many well-preserved specimens of native Mexicae feather-work in existence, and every addition to their number is of interest and importance. During a recent visit to the land which gave birth to the conquerors of Mexico, Mrs. Zelia Nuttall — whose researches on Mexican antiquities are well known — was so fortunate as to discover a fine example of Mexican feather-mosaic in the shape of a valuable shield, with an authentic history, preserved in the Royal Armory of Madrid. It is known as the shield of Philip the Second, for whom it was indubitably made in Spain of cane and leather in the oval shape of the Moorish *adarga*. It was then sent out to Mexico with four beautiful Spanish designs of historical scenes and a central device. These were executed in Mexico entirely of feather-mosaic, which covers the whole surface of the shield and makes it one of the most surprising and superb examples of this curious lost art of miniature painting with feathers. Mrs. Nuttall has paid considerable attention to the subject of ancient Mexican feather-work, and has already accumulated novel data which promise to throw light on the methods of its manufacture. We may look for an interesting paper on this subject from her pen before long.

Soon after the shield in question was identified by her as of Mexican workmanship — an unrecognized fact which was not recorded in the oldest Inventories — it was removed from the Royal Armory and placed on exhibition in the interesting Hispano-American Historical Exposition in Madrid. In the Spanish section of the same building may now be found also the elaborate tables, fourteen metres long, originally dasigned to illustrate Mrs. Nuttall's "Preliminary Note on the Ancient Calendar of the Axtecs," which formed the most original and valuable communication presented to the recent Americanist Congress at Huelva. It was then generally admitted that Mrs. Nuttall had fairly solved the great problem which has long puzzled Mexicanist students in general. Guided by a luminous passage occurring in an unpublished Hispano-Mexican MS. which she had previously discovered in a Florentine library and intends to reproduce in *fac-simile*, Mrs Nuttall may be said to have furnished the key to the hitherto unknown calendar system of the ancient Aztecs. It now seems to be of a very simple and harmonious character and to have been employed by them, judging from astronomical calculations, for a period of at least 4,000 years.

The Mexican cycle, it appears from these researches, was one of 13,515 days. It comprised 52 *ritual* years, less five days at the end of the cycle, each year of 260 days, or 51 *lunar* years of 265 days, based on nine moons in each year, or 37 *solar* years of 365 days in each year. At the end of the fifty-first *lunar* year ten intercalated days made the *lunar* year equal to the *solar* year, in such a manner that the new cycle began in the same lunar and solar positions as the preceding cycle of 13,515 days. Each period began with a day bearing one of four names, *acatl*, *tecpatl*, *calle'*, or *tochtle'*.

This is the most important discovery hitherto made known by the indefatigable Nahuatl scholar. Full details will eventually be published in one of the Peabody Museum papers of the American Museum of Archæology, on which Mrs. Zelia Nuttall, special assistant in Mexican archæology, and director of the same department in the Columbian Exhibition, has already reflected much honor.

AGNES CRANE.

Brighton, England, Dec. 20, 1892.

Is it Instinct or Intelligence?

I HAVE a nearly pure-blooded water spaniel. Though a great pet and most valuable watch-dog, in my busy life I have devoted little time to training him, — rather have watched carefully the development and application of his own powers, under a uniformly kind treatment. When only five weeks old, he made his first debut into the open world, — following mother and myself to church. Crossing the street, we heard the patter of little feet, and, looking around, I saw his nose close to the ground as the little ball trudged along. I took him home and started again, only to have the performance repeated, but this time I shut him in the house. Just as church service opened, mother thought she felt something strangely warm at her feet. And lo! there was Master Carlo. He had escaped, perseveringly followed our track around two blocks, and discovered mother in the congregation. From that time a remarkably keen scent has been a prominent quality. Early he manifested a love for watching and chasing chickens, — a pastime not to be neglected with the small opportunities of the city. We soon, by kindness and firmness and much talking, broke him of disturbing our own chickens. We often took a little chick in our hands, and said to him "pretty chickey, Carlo's chickey!" and allowed him to lick it gently. Soon it was not only safe, but safer to have him in the pen with the chicks than otherwise, as then no rat or mouse dared venture there. From the first, Carlo has deemed these marauders worthy of death whenever and wherever seen, and acts out his convictions. As the chickens grew, and Thanksgiving approached, their number was reduced to twelve, and these were transferred to the barn. Every night for two years Carlo made a detour of the perches, giving each fowl a good lick, — they were so acquainted it did not alarm them at all, — and if one or more of the number was absent, he would immediately scour the premises till it was found, then gave a peculiar bark indicating the discovery; nor would he give it up till the number was complete. Could he count? How did he know there should be just twelve — no more, no less? Occasionally a stray fowl would come to our yard. This he tormented by keeping it constantly "on the move," not by making it run, but simply kept it walking about, persistently, unless it flew to the street, when he considered it game, and pursued it thoroughly. The following spring and summer, as the chicks began to lay, he took it upon himself, without any teaching by me, to find and bring in the eggs, never sucking any, and rarely breaking them if broken, it was because he laid them down too heavily upon the veranda floor. When a